UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.

EXAMINER	
ART UNIT	PAPER NUMBER
	13

DATE MAILED:

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 09/577,657	Applicant(s) MIZUNO ET AL.	
	Examiner Anne Kubelik	Art Unit 1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 August 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) *8-10,15,24 and 25* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,11-14 and 16-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Applicant's election with traverse of Group I (claims 1-7, 11-14 and 16-23) in Paper No. 12 is acknowledged. The traversal is on the ground(s) that that it would not be an undue burden on the Examiner to search all the Groups, as the groups contain overlapping subject matter.

This is not found persuasive because a protein can be isolated from the natural source and characterized in detail without knowledge of the DNA that encodes it, and in fact, many proteins were isolated years before DNA cloning and sequencing were possible. Thus, a search on the protein is not coextensive with the search on the DNA.

Furthermore, the claims are not limited to single nucleic acid sequences or amino acid sequences, but encompass a multitude of nucleic acid sequence variants encoding a multitude of amino acid sequences with varying properties.

The transformed bacterial cells and method of producing proteins of Group II require different searches than does a search on the transformed plants and method of producing a plant secondary metabolite of Group I.

Claims 8-10, 15 and 24-25 are withdrawn from consideration.

The requirement is still deemed proper and is therefore made FINAL.

Priority

2. Acknowledgment is made of Applicant's claim for foreign priority based on an application filed in Japan on 26 May, 1999. It is noted, however, that Applicant has not filed a certified copy of that application as required by 35 U.S.C. 119(b).

Drawings

3. The drawing on pg 2 should not be incorporated into the body of the specification, but should submitted on a separate sheet of paper. See 37 CFR 1.81, 37 CFR 1.84 and MPEP § 608.02.

Specification

4. A substitute specification in proper idiomatic English and in compliance with 37 CFR 1.52(a) and (b) is required. The substitute specification filed must be accompanied by a statement that it contains no new matter. The specification as filed uses words that do not make sense (*e.g.*, "gusts" on pg 1, last line) and phraseology that is not grammatical or does not follow standard English usage (*e.g.*, "In Photochemistry ... there is disclosed by experiments using C14 tracer...." on pg 2, lines 4-5). Additionally, there appear to be numerous misspellings (*e.g.*, "Amasham" on pg 12, third line from the bottom, and "maker resistance" on pg 39, line 3).

A substitute specification filed under 37 CFR 1.125(a) must only contain subject matter from the original specification and any previously entered amendment under 37 CFR 1.121. If the substitute specification contains additional subject matter not of record, the substitute specification must be filed under 37 CFR 1.125(b) and must be accompanied by: 1) a statement that the substitute specification contains no new matter; and 2) a marked-up copy showing the amendments to be made via the substitute specification relative to the specification at the time the substitute specification is filed.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 1-6 and 11-12 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims are drawn to DNA and RNA molecules, which read on a products of nature.

The DNA and RNA molecules, as claimed, have the same characteristics and utility as those found naturally in the genome or as cellular precursors thereof and therefore does not constitute patentable subject matter. See *American Wood v. Fiber Disintegrating Co.*, 90 U.S. 566 (1974), *American Fruit Growers v. Brogdex Co.*, 283 U.S. 2 (1931), *Funk Brothers Seed Co. v. Kalo Inoculant Co.*, 33 U.S. 127 (1948), *Diamond v. Chakrabarty*, 206 USPQ 193 (1980). It is suggested that the claims be modified to refer to the hand of the inventor, *e.g.* by replacing "A" or "An" with --An isolated-- or --A purified-- in claims 1, 4, 11 and 12.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 1-2, 4-5, 7, 11-14 and 16-23 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for nucleic acids of SEQ ID NO:2 or those encoding SEQ ID NO:1 and plant cells and plants transformed with those nucleic acids, does not reasonably provide enablement for nucleic acids that encode SEQ ID NO:1, encode modified nucleic acids or that hybridize under unspecified stringency to nucleic acids that encode SEQ ID NO:1. The specification does not enable any person skilled in the art to which it pertains, or with

which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

The claims are broadly drawn to nucleic acids of SEQ ID NO:2, that encode SEQ ID NO:1, that are modified versions of those nucleic acids, or that hybridize under unspecified stringency to nucleic acids that encode SEQ ID NO:1 and plants transformed with those nucleic acids.

The instant specification, however, fails to provide guidance for which amino acids of SEQ ID NO:1 can be altered and to which other amino acids, and which amino acids must not be changed, to maintain 7-methylxanthine N3 methyl transferase, theobromine N1 methyl transferase and paraxanthine N3 methyl transferase activities of the encoded protein. The specification also fails to provide guidance for which amino acids can be deleted and which regions of the protein can tolerate insertions and still produce a functional enzyme.

It cannot be predicted by one of skill in the art that nucleic acids that encode modified nucleic acids of those that encode SEQ ID NO:1 or that hybridize under unspecified stringency to nucleic acids that encode SEQ ID NO:1 will encode a protein with the same activity as SEQ ID NO:2. Bowie et al (1990, Science 247:1306-10) teach that an amino acid sequence encodes a message that determines the shape and function of a protein and that it is the ability of the protein to fold into unique three-dimensional structures that allows it to function and carry out the instructions of the genome. The cited reference also teaches that the prediction of protein structure from sequence data and, in turn, utilizing predicted structural determinations to ascertain functional aspects of the protein, is extremely complex (pg 1306, left column). Bowie et al teach that while it is known that many amino acid substitutions are possible in any given protein, the positions within the protein's sequence where such amino acid substitutions can be

made with a reasonable expectation of maintaining function are limited. Certain positions in the sequence are critical to the three-dimensional structure/function relationship, and these regions can tolerate only conservative substitutions or none at all (pg 1306, right column).

The sensitivity of proteins to alterations in even a single amino acid in a sequence is exemplified by Lazar et al (1988, Mol. Cell. Biol. 8:1247-1252), who teach that a replacement of aspartic acid at position 47 with alanine or asparagine in transforming growth factor alpha had no effect, but that replacement with serine or glutamic acid sharply reduced biological activity (see the abstract). Small changes in amino acid sequence can completely modify enzymatic function; Broun et al (1998, Science 282:1315-1317) teach that a change of four amino acids converts an oleate 12-desaturase to a hydroxylase. Thus, Lazar et al and Broun et al demonstrated that one or few amino acid substitutions could dramatically affect the biological activity and the structure-function characteristics of a protein.

Making "conservative" substitutions (*e.g.*, substituting one polar amino acid for another, or one acidic one for another) does not produce predictable results. Lazar et al (*supra*) showed that the "conservative" substitution of glutamic acid for aspartic acid at position 47 reduced biological function of transforming growth factor alpha while "nonconservative" substitutions with alanine or asparagine had no effect (abstract). Similarly, Hill et al (1998, Biochem. Biophys. Res. Comm. 244:573-577) teach when three histidines that are maintained in ADP-glucose pyrophosphorylase across several species are substituted with the "nonconservative" amino acid glutamine, there is little effect on enzyme activity, while the substitution of one of those histidines with the "conservative" amino acid arginine drastically reduced enzyme activity (see Table 1). All these mutated proteins, however, would have at least 95% identity to the

original protein. The nucleic acids encoding all these mutated proteins, however, would hybridize under high stringency to the nucleic acids encoding the original protein.

In addition, SEQ ID NO:1 does not appear to be the entire protein sequence. Kato et al (2000, Nature 406:956-957) teach a gene encoding a caffeine synthase that is identical to the caffeine synthase of the instant invention except the published enzyme is 13 amino acids longer at its N-terminal (see sequence search results). All experiments involving transformation used a DNA comprising SEQ ID NO:2, which is almost identical to the nucleic acid taught by Kato et al and would encode the full-length enzyme (see marked-up copy of the nucleic acid sequence search results). There is no evidence to suggest that a nucleic acid only encoding SEQ ID NO:1 would function to encode an enzyme with the listed properties, especially since the starting ATG is missing.

Given the claim breath, unpredictability, and lack of guidance as discussed above, undue experimentation would have been required by one skilled in the art to develop and evaluate nucleic acids of SEQ ID NO:2, that encode SEQ ID NO:1, that are modified versions of those nucleic acids, or that hybridize under unspecified stringency to nucleic acids that encode SEQ ID NO:1 and plants transformed with those nucleic acids.

9. Claims 18-23 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter that was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The claims are broadly drawn to methods for producing any plant secondary metabolite in any plant and for modifying the composition of any plant secondary metabolite in any plant. The methods are presumably accomplished by transformation with a nucleic acid of SEQ ID

NO:2, that encodes SEQ ID NO:1, that encodes modified nucleic acids, or that hybridizes under unspecified stringency to nucleic acids that encode SEQ ID NO:1.

The instant specification, however, only provides guidance for suppression of N-methyl transferase activity in coffee by transformation with an antisense construct comprising SEQ ID NO:2 (pg 37-39). There was no demonstration that the levels of caffeine or the levels of any other plant secondary metabolite were altered.

Antisense constructs that are not completely homologous to the target gene can have very unpredictable effects. Colliver et al (1997, Plant Mol. Biol. 35:509-522) showed that transformation of bird's foot trefoil with a construct that was antisense to bean chalcone synthase resulted in transformants with *increased* levels of both chalcone synthase transcripts and tannin (pg 519, left column, paragraph 2, and Fig. 7) and note other instances when this phenomenon has occurred (pg 519, right column, paragraph 1). Thus, there is no guarantee that an antisense construct from one plant will inhibit sense gene transcription or secondary metabolite levels when transformed into a plant of a different species.

Plants of different species in which the expression of the same gene is inhibited via antisense constructs can behave very differently. While tomatoes containing an antisense acid invertase DNA construct grew identically to control plants (Klann et al, 1996, Plant Physiol. 112:1321-1330; see the abstract and pg 1323, right column, paragraph 1), carrot development is drastically altered when acid invertase expression is reduced via an antisense construct (Tang et al, 1999, Plant Cell 11:177-189; see pg 179, left column, paragraphs 1-2, and pg 184, left column, paragraph 1).

The claims are also drawn to a method of producing a plant secondary metabolite in a plant. Overexpression of a gene in plants is unpredictable. Sweetlove et al (1996, Biochem. J.

320:493-498) found no differences in starch content, tuber number, tuber weight, or metabolite content between potatoes transformed with a gene encoding ADP-glucose pyrophosphorylase and potatoes from control plants, even though the activity of the enzyme was four-fold higher in the transformed plants (pg 495, entire pg, and pg 497, right column, paragraph 3). Thiele et al (1999, Plant Physiol. 120:73-81) teach that in potato plants transformed with the *Arabidopsis* phytochrome B gene, the endogenous phytochrome B transcript levels were not significantly affected (pg 75, right column, paragraph 3, and Fig. 1).

The instant specification does not teach production of ANY plant metabolite. Alteration of secondary metabolites is unpredictable. As an example, petunia transformed with the gene encoding a key enzyme in production of the secondary metabolite anthocyanin unexpectedly showed varying flower color phenotypes (Flavell et al, 1995, Instability of Transgenes in Plants and Its Implications for Plant Breeding, *In:* Induced Mutations and Molecular Techniques for Crop Improvement, International Atomic energy Agency, Vienna, pg 13-22, see pg 15). As the secondary metabolite anthocyanin was not addressed by the instant specification, the effect of a gene involved in a pathway not involved in anthocyanin production on anthocyanin production has not been addressed, and the unpredictability of obtaining transformants with altered production of any secondary metabolite has not been overcome.

The claims are also drawn to a method for changing the structure of any plant secondary metabolite (versus changing profile, ratio, or concentration). The instant specification provides no guidance for altering the structure of any plant metabolite, including caffeine or caffeine precursors.

Lastly, claim 23 is drawn to transformation of Camellia, Cola, Ilex, Neea, Firmiana, Paullinia, and Therbroma [sic] plants, as well as Coffea plants. The instant speciation only

teaches transformation of coffee plants, and even the current art does teach methods of transformation of most of these plants.

Given the claim breath, unpredictability, and lack of guidance as discussed above, undue experimentation would have been required by one skilled in the art to develop and evaluate methods for producing any plant secondary metabolite in any plant and for modifying the composition of any plant secondary metabolite in any plant.

10. Claims 1-2, 4-5, 7, 11-14 and 16-23 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claims are broadly drawn to a multitude of DNA molecules that are modified versions of nucleic acids of SEQ ID NO:2, that encode a truncated version of SEQ ID NO:1 or that hybridize under unspecified stringency to nucleic acids that encode SEQ ID NO:1. In contrast, the specification only describes a coding sequence from *Camellia sinensis* that comprises SEQ ID NO:2, which encodes a full-length enzyme.

No description is provided as to the structural features that distinguish genes that encode proteins with 7-methylxanthine N3 methyl transferase, theobromine N1 methyl transferase and paraxanthine N3 methyl transferase activities from all the other genes in plant species other than *C. sinensis*.

Hence, Applicant has not, in fact, described DNA molecule that encodes an N-methyl transferase within the full scope of the claims, and the specification fails to provide an adequate written description of the claimed invention.

Therefore, given the lack of written description in the specification with regard to the structural and physical characteristics of the claimed compositions, and given the high level of unpredictability in this art, one skilled in the art would not have been in possession of the genus claimed at the time this application was filed.

See *University of California v. Eli Lilly*, 119 F.3d 1559, 43 USPQ 2d 1398 (Fed, Cir. 1997):

> The name cDNA is not in itself a written description of that DNA; it conveys no distinguishing information concerning its identity. While the example provides a process for obtaining human insulin-encoding cDNA, there is no further information in the patent pertaining to that cDNA's relevant structural or physical characteristics; in other words, it thus does not describe human insulin cDNA .... Accordingly, the specification does not provide a written description of the invention ....

and at pg 1406:

> a generic statement such as "vertebrate insulin cDNA" or "mammalian insulin cDNA," without more, is not an adequate written description of the genus because it does not distinguish the genus from others, except by function. It does not specifically define any of the genes that fall within its definition. It does not define any structural features commonly possessed by members of the genus that distinguish them from others. One skilled in the art therefore cannot, as one can do with a fully described genus, visualize or recognize the identity of the members of the genus. A definition by function, as we have previously indicted, does not suffice to define the genus because it is only an indication of what the genes does, not what it is.

See *Amgen Inc. v. Chugai Pharmaceutical Co. Ltd.*, 18 USPQ 2d 1016 at page 1021:

> A gene is a chemical compound, albeit a complex one, and ... conception of a chemical compound requires that the inventor be able to define it so as to distinguish it from other materials .... Conception does not occur unless one has a mental picture of the structure of the chemical or is able to define it by its method of preparation, its physical or chemical properties, or whatever characteristics sufficiently distinguish it. It is not sufficient to define it solely by it principal biological property, *e.g.*, encoding human erythropoietin, because an alleged conception having no more specificity than that is simply a wish to know the identity of any material with that biological property.

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claims 1-7, 11-14 and 16-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicant regards as the invention.

Dependent claims are included in all rejections.

The claims are generally narrative and indefinite, failing to conform with current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors. Some of these errors are detailed below.

Recitation of "of a sequence listing" or "of the sequence listing" in claims 1(a), 3, 4(a) and 6 is indefinite and unduly wordy. It is not clear to which sequence listing, the one in the instant application or some other one, the claim is referring. Deletion of the phrase is suggested.

The phrase "that is a polypeptide having an amino acid sequence of SEQ ID NO:1" in claims 1(a) and 4(a) is unduly wordy. Furthermore, it is unclear whether the entire sequence, or just a single amino acid from that sequence, is intended. It is suggested that the phrase be replaced with --of SEQ ID NO:1--.

Claims 1 and 4 are indefinite because parts (a) and (b) are not recited in the alternative. The DNA and RNA of the claims could comprise both one encoding SEQ ID NO:1 and a modified nucleic acid. See MPEP 2173.05(h).

Claims 1(b) and 4(b) are indefinite in their recitation of "obtained by carrying out nucleotide replacement, deletion, or insertion". It is not clear how many nucleotides have been replaced, deleted or inserted, or which ones have been replaced, deleted or inserted. For purposes of examination, it was assumed that as few as one and as many as all nucleotides had been replaced, deleted or inserted. Such treatment does not relieve Applicant of the responsibility to respond to this rejection.

Claims 1(b) and 4(b) are indefinite in their recitation of "in said nucleotide sequence (a) within a range where a polypeptide encoded by said nucleotide sequence (a) can maintain said enzyme activities". From the way this part of the claim is worded it appears that the nucleotide

sequence is not modified because the claim requires that the polypeptide be that encoded by the nucleic acid of part (a). For purposes of examination, it was assumed that the modified nucleic acid also encodes a methyl transferase. Such treatment does not relieve Applicant of the responsibility to respond to this rejection.

Claim 1 is indefinite in its recitation of "enzyme activities of 7-methylxanthine N3 methyl transferase, theobromine N1 methyl transferase and paraxanthine N3 methyl transferase." It is unclear to which enzyme activities - binding, catalysis, localization, heat denaturation - are being referred. for purposes of examination any of these were assumed. Such treatment does not relieve Applicant of the responsibility to respond to this rejection.

Claims 2 and 5 are indefinite in their recitation of "under stringent conditions". The level of stringency is unclear. For purposes of examination, all levels were assumed. Such treatment does not relieve Applicant of the responsibility to respond to this rejection.

Claims 3 and 6 are indefinite in their recitation of "a nucleotide sequence of SEQ ID NO:2" and "a nucleotide sequence of SEQ ID NO:3", respectively. It is unclear whether the entire sequence, or just a single nucleotide from that sequence, is intended. It is suggested that the phrase be replaced with --of SEQ ID NO:1-- in claim 3 and -of SEQ ID NO:6-- in claim 6.

Claim 7 is indefinite for its recitation of "a constitution for expressing". The word "constitution" is not an art recognized term. If --promoter-- or --regulatory sequence--is intended, then whichever of those terms is supported by the specification should replace "constitution".

Claims 11 and 12 are indefinite in their recitation of "all or part of". The size of this part is unclear. For purposes of examination, parts as small as a single nucleotide were assumed. Such treatment does not relieve Applicant of the responsibility to respond to this rejection.

Claims 11 and 12 are indefinite in their recitation of "wherein the enzyme activities of the plant cells can be inhibited when introduced into plant cells having said enzyme activities". It appears from the claim that either enzyme activities or plant cells are being introduced into plant cells and expressed. Neither makes sense. Additionally, it is unclear which enzyme activities of the plant cells are inhibited.

Claim 13 is indefinite in its recitation of "A vector comprising ... an RNA molecule as claimed in claim 1". First, claim 1 is drawn to a DNA molecule. Second, vectors in molecular biology do not commonly comprise RNA molecules.

Claim 14 is indefinite in its recitation of "N-methyl transferase having enzyme activities of 7-methylxanthine N3 methyl transferase, theobromine N1 methyl transferase and paraxanthine N3 methyl transferase ... or having a function of inhibiting the expression of the N-methyl transferase". It is suggested the claim be reworded to state that the vector encodes an enzyme with 7-methylxanthine N3 methyl transferase, theobromine N1 methyl transferase and paraxanthine N3 methyl transferase activities. Because it is not clear if "having a function of inhibiting the expression of the N-methyl transferase" modifies "N-methyl transferase" or 'vector", it is suggested that a separate claim be written to claim a vector that encodes an RNA that inhibits that enzyme.

Claim 14 is not written in proper alternative format. The phrase "cells of at least one of microorganisms and plants" should be rewritten in Markush format ("cells selected from the group consisting of microorganisms and plants") or to replace "and" with "or". The latter is not recommended unless a separate claim be written to claim a vector that encodes an RNA that inhibits that enzyme, as having multiple alternatives with a claim is confusing. See MPEP § 2173.05(h).

Claims 16-21 and 23 are indefinite in their recitations of "plant body". It is unclear what is meant by "plant body" as this is not art-recognized terminology.

Claims 19 and 21 recite the limitation "the plant secondary metabolite" in lines 1-2. There is insufficient antecedent basis for this limitation in the claims.

Claim 20 recites the limitation "the plant body" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

Claim 18-21 recites the limitation "the plant cell or plant tissue" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claims 18-19 are indefinite in their recitation of "using the plant cell, plant tissue, or plant body as claimed in claim 16." Claim 16 is not drawn to a method of using a plant cell, plant tissue, or "plant body".

Claims 20 needs an "a" before "plant secondary metabolite".

Claim 23, and the specification, is indefinite in its recitation of "Therbroma" as there is no plant genus named "Therbroma". The genus of the cocoa plant is "Theobroma".

Claims 18-19 provide methods for producing and modify the composition of plant secondary metabolite, respectively. The only method step in this claims is "using" the plant cells, tissues or bodies of claim 16. Method claims must set forth active, positive steps delimiting the method/process. A claim is indefinite where it merely recites a use without any indication of how this use is actually practiced.

13. Claims 18-23 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. Method steps must be circular; the final step must generate the item the method is intended to produce. For example, the method of modifying the composition of plant secondary

metabolite in claim 21 ends in culturing a plant cell or tissue or growing a plant body, when it should end in the production of a plant with a modified composition of plant secondary metabolite.

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

15. Claims 1-2, 4-5, 7, 11-14 and 16-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Stiles et al (US Patent 6,075,184, filed March, 1996).

Stiles et al teach an isolated nucleic acid encoding a xanthosine-N7-methyl transferase, and a method of using that nucleic acid to modify the plant caffeine levels (claims 1-42). This nucleic acid would encode a modified version of SEQ ID NO:1, would hybridize under low stringency conditions, and the protein it encodes would share an "enzyme activity" with it.

16. Claims 3 and 6 are free of the prior art, given the failure of the prior art to teach or suggest an isolated nucleic acids encoding SEQ ID NO:1.

Conclusion

17. No claim is allowed.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anne R. Kubelik, whose telephone number is (703) 308-5059. The examiner can normally be reached on Monday through Friday, 8:15 am - 4:45 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paula K. Hutzell, can be reached on (703) 308-4310. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-4242 for regular communications and (703) 308-4242 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0196.

Anne R. Kubelik, Ph.D.
October 11, 2001

DAVID T. FOX
PRIMARY EXAMINER
GROUP ~~180~~ 1638